



## Comments on the PCAST Report from the IAI FW /TT Science and Practice Subcommittee

In response to the [PCAST report](#) entitled “Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods”, the following is a series of comments regarding the footwear portion of the report.

Although this report bears inaccuracies related to forensic footwear examination, it is our hope that it will serve to encourage ongoing conversation related to forensic standards, foster increased support of foundation building and the operational aspects of forensic science as well as serve to increase support for continuing research.

Following the comments are specific research topics that support the identification of footwear impression evidence. It is important to note that although PCAST did not address class associations, this is an integral part of the examination process and comprises the majority of the casework of footwear examiners. A complete list of foundational studies for footwear impression evidence is available on this link;

- There is a statement in the report on page 3 that implies that faulty testimony from forensic scientists has been responsible for wrongful convictions. A review of the sources cited found that one case refers to testimony about footwear impressions provide by an Anthropologist, not a footwear expert (Rolando Cruz case). One other case from the 1980’s reveals that an FBI examiner testified about walking gait in addition to a footwear examination (Charles Irvin Fain case). No cases were found that included an example of tire impression testimony. While clearly any inappropriate or improper testimony is unacceptable, these two examples do not indicate the existence of a systematic problem with footwear or tire testimony provided by properly trained forensic scientists.
- On page 24: The report refers to the inclusion of comments from the forensic community during its process of open solicitation. However, the investigators’ dialog with knowledgeable expert professionals in this field (footwear and tire

examination) was limited to a one-hour conference call with approximately five examiners. It is unreasonable to expect a complete understanding of a profession or practice, to the extent necessary to conduct a thorough evaluation, within that timeframe.

- Pages 12-13 and 114-115: The report states that class characteristics are not a “measurement problem” and are understood by juries. Because of this assertion, the committee essentially leaves this aspect of the examination unquestioned. The omission of the significance of class characteristics shows an incomplete evaluation and understanding of the discipline as the examination of class characteristics constitute the vast majority of footwear and tire examination casework.
- Page 115: The resources that are cited (Smith and Bodziak) are quoted out of context. They are not advocating identifications based on a single random accidental characteristic (RAC). Instead Smith discusses the “support” of a RAC for identification, and Bodziak is discussing the significance of clarity and sufficient features with many irregularities.
- Pages 116 and 117: The report is dismissive of existing research related to the inter-comparison of footwear examiner consistency. The PCAST report concludes that for footwear examination, examiner consistency is not an important issue, only accuracy is. This is in direct conflict with its definition of establishing validity of a method as described on p 5 (2); that includes reproducibility and consistency as key components.
- Pages 116 and 117: The PCAST report addresses the need for black box studies within in the FW/TT discipline citing a website accessed February 2016 (footnote 349) that indicates no such studies are in progress. A more thorough evaluation of this discipline would have revealed that such studies are in process at West Virginia University (NIJ Award 2016-DN-BX-0152) and the FBI Laboratory.
- Page 117: It is stated that “there is little research on which to build association conclusions (identifications)”. However, references on this topic were provided to the PCAST committee on several occasions, and are included in the references document associated with the report. Their absence from consideration in the report is concerning. Below are the reference cites for studies related to the identification of footwear evidence including features from wear and random accidental characteristics. Those noted with an \* were listed in the PCAST sources, but apparently not considered in the assessment of existing resources.

\*Adair, T. W., LeMay, J., McDonald, A., Shaw, R., & Tewes, R. (2007). The Mount Bierstadt Study: An Experiment in Unique Damage Formation in Footwear. *Journal of Forensic Identification*, 57(2), 199-205.

\*Bodziak, W., Hammer, L., Johnson, G., & Schenck, R. (2012). Determining the Significance of Outsole Wear Characteristics During the Forensic Examination of Footwear Impression Evidence. *Journal of Forensic Identification*, 62(3), 254-276.

\*Davis, R. J., & DeHaan, J. D. (1977). A survey of Men's Footwear. *Journal of Forensic Science Society*, 17(4), 271-285.

\*Fruchtenict, T. L., Herzig, W. P., & Blackledge, R. D. (2002). The discrimination of two-dimensional military boot impressions based on wear patterns. *Science and Justice*, (42)2, 97-104.

\*Petraco, N. D., Gambino, C., Kubic, T. A., Olivio, D., & Petraco N. (2010). Statistical Discrimination of Footwear: A Method for the Comparison of Accidentals on Shoe Outsoles Inspired by Facial Recognition Techniques. *Journal of Forensic Sciences*, (55)1, 34-41.

\*Sheets, D. H., Gross, S., Langenburg, G., Bush, P. J., & Bush, MA. (2013). Shape measurement tools in footwear analysis: A statistical investigation of accidental characteristics over time. *Forensic Science International*, 232(1-3), 84-91.

Speir, J.A., Richetelli, N., Fagert, M., Hite, M., & Bodziak W. J. (2016). Quantifying randomly acquired characteristics on outsoles in terms of shape and position. *Forensic Science International*. 266, 399-411.

\*Wilson, H. (2012). Comparison of the Individual Characteristics in the Outsoles of Thirty-Nine Pairs of Adidas Supernova Classic Shoes. *Journal of Forensic Identification*, 62(3), 194-203.

Yekutieli, Y., Shor, Y., Wiesner, S, & Tsach, T. (2016, September). Expert Assisting Computerized System for Evaluating the Degree of Certainty in 2D Shoeprints (Document No. TP-3211). Retrieved from the National Criminal Justice Reference Service: <https://www.ncjrs.gov/pdffiles1/nij/grants/25033>